

REMARKS

This Amendment is prepared in response to the Office action mailed on 18 July 2007 (Paper No. 20070705).

Listing of the Claims

Pursuant to 37 CFR §1.121(c), this listing of the claims, including the text of the claims, will serve to replace all prior versions of the claims, in the application.

Amendment of the Claims

Claim 1, 6 and 11 are amended in this paper.

Amendment of the Specification

Applicant has amended paragraphs [0007] and [0041] as follows by this Amendment:

[0007] Meanwhile, according to Shannon-Heartley Capacity theory, the telephone lines (Twisted Pair) are characteristic of reducing a maximum transfer rate as it is a longer way. So, if distance between the DSLAM and the CPE is far away from a regular range, efficiency and a signaling speed of the xDSL get lower and lower. As a result, an Asymmetric Digital Subscriber Line (ADSL) system or a Very ~~high-rate~~ high-data rate Digital Subscriber Line (VDSL) system cannot overcome distance limits in spite of high technologies.

[0041] First, as for downward transmission data, the CPE module 221 receiving the data transmitted from the DSLAM 100 separates the data and transmits the separated data in order to retransmit the data to the CO module 223 through the controller 222. The CO module 223 receiving the data retransmits the data to a next CPE port. As for upward transmission data similar to the downward transmission data, the CO module 223 receiving the data from the CPE module ~~300~~ 221 in the next terminal box retransmits the received data to the CPE module 221 through the controller 222.

Amendment of the Drawings

A label 200 for terminal box is added in Fig. 3 and Fig. 4.

Status of the Claims

Claims 1-15 are pending in this application.

Issues Raised by Paper No. 20070705

- I. Claims 1 through 3, 6 through 8, 11 through 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Kerkhof (US 2006/0209864 A1; hereinafter Kerkhof).
- II. Claims 4, 5, 9, 10, 14 and 15 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kerkhof (US 2006/0209864 A1; hereinafter Kerkhof) in view of Witty et al. (US 6782097 B2; hereinafter Witty).

Claim Rejections - 35 U.S.C. §102(e) and 35 U.S.C. §103 (a)

I. Rejection of Claims 1-3, 6-8, 11-13 Under 35 U.S.C. §102(e)

Claim 1, 6, 11

On page 2 of Paper No. 200707005, the Examiner states:

“As to claims 1,6, and 11 Kerkhof shows a system for extending a distance of x Digital Subscriber Line using a reserved telephone line (abstract; Fig 2), comprising: a Customer-Provided Equipment (CPE11) for supplying an x Digital Subscriber Line transmission service to a subscriber terminal; a Digital Subscriber Line Access Multiplexer (DSLAM 20) setting an initial link with the Customer-Provided Equipment for an x Digital Subscriber Line service, and transceiving data with the Customer-Provided Equipment through the set link(abstract); and a distance extension module (Repeater Container 23) being installed with at least more than one module between the Digital Subscriber Line Access Multiplexer and the Customer-Provided Equipment (Par. 0024), in order to receive x Digital Subscriber Line transmission data from the Digital Subscriber Line Access Multiplexer in connection with an optional reserved telephone line selected from telephone line bundles incoming from the Digital Subscriber Line Access Multiplexer (Figure 2; par. 0020), and after separating the received transmission data, to transmit the separated transmission data to a module of a back end or the Customer-Provided Equipment, or to transmit transmission data received from the module of the back end or the Customer-Provided Equipment (Figure 2; abstract). Kirkhof shows the method in claim 6 as shown in the rejection above.”

Applicant respectfully traverses this rejection for the following reasons, and notes in the following paragraphs the various deficiencies and omissions in the Examiner's characterization of the prior art applied to support the rejection of Claim1, 6 and 11 of this invention:

(1) Subjects of this invention

Rejected Claims 1, 6 and 11 define, among other things, a distance extension module for extending transmitting distance of data, while Kerkhof '639 is restricted an OMU for transmitting data by separating transmitted signal in separate lines.

(2) The “reserved telephone lines”

Applicant's claims employ the reserved telephone lines among the telephone lines in a bundle connected from home to DSLAM (Signal Subscriber Line Access Multiplexer) for extending xDSL service distance. As explained by Applicant, it is the convention in the art for the reserved telephone lines are the selected telephone lines which are not currently used at home. The reserved telephone lines are those telephone lines that do not have the best feature at home. (See [0005]) The **xDSL data** transmitting in the reserved telephone lines and reserved telephone lines are same.

Kerkhof '639 employs lines separate from the digital subscriber lines for communicating between the OMUs (Operation and Maintenance Units) of the repeaters, because the **signal transmitted in the separate lines are voice baseband** only which is resistant against influences from voice signals and data signals going through the repeaters. The Examiner's attention is invited to note that Kerkhof '639 also does not state that the lines between OMUs are reserved telephone lines among the telephone lines bundle to home. See, for example, the cited passage of Kerkhof '639 which in [0006], Kerkhof '639 states that:

“The system provided by the invention provides out-band

management of operations and maintenance of several repeaters contained in the repeater container, that is apart from the voice signals and data signals going through the repeaters, which makes said management resistance against influences from such signals and malfunction of one or more repeaters. Communication between the operations and maintenance units may need the voice baseband only, so that the copper pair connecting the operations and maintenance units may be any of the bundle it is part of in view of possibly adverse influence from other pairs of the bundle.”

Consequently, Kerkhof ‘639 fails to teach a system for extending a distance of xDSL by employing reserved telephone lines. In other words, there is no anticipation of Applicant’s claim 1, lines 8 through 16 and Applicant’s establishing a “connection with an optional reserved telephone line selected from telephone line bundles incoming from the Digital Subscriber Line Access Multiplexer”; or anticipation of Applicant’s claim 6, lines 8 through 16 and Applicant’s establishing a “connection with an optional reserved telephone line selected from telephone line bundles incoming from the Digital Subscriber Line Access Multiplexer”; or anticipation of Applicant’s claim 11, lines 8 through 14 and Applicant’s establishing a “connection with an optional reserved telephone line selected from telephone line bundles incoming from the second unit”. As was explained by the Court of Appeals for the Federal Circuit, under both *Graham v. John Deere* and under post *KSR International* practice,

[a] signal corresponding to a word is not the same as a signal corresponding to a letter.” *Leapfrog Enterprises v. Fisher-Price*, ___ F.3d ___, ___ USPQ2d ___ (CAFC 2007). Consequently, a **xDSL data** is not the same as **voice baseband signal**. This feature may not be ignored under 35 U.S.C §102(e).

When determining infringement, or anticipation, signals, and their carriers, may not be broadly interpreted in order to obliterate the distinctions between signals. Reconsideration of this rejection is therefore, respectfully requested.

(3) The “CPE”

Kerkhof ‘639 states that the CPE having a NTU (network terminating unit) is connected to DSLAM having a LTU (line trunk unit). The xDSL service communicates either directly between CPE having a NTU and DSLAM having a LTU, or through a repeater container. See Kerkhof ‘639 [0002] and Fig. 2. Kerkhof ‘639 nowhere states a reserved telephone line is employed between the DSLAM and CPE.

The CPE in the claim 1 of this invention is either connected to a TAB, and then to the DSLAM (shown as in Fig. 3 of this invention); or connected to the distance extension module by using a reserved telephone line which transits the DSLAM services (shown as in Fig. 4 of this invention). In other words, there is no anticipation of Applicant’s claim 1, lines 3 and Applicant’s establishing a “Customer-Provide Equipment for supplying an x Digital Subscriber Line transmission service”.

The CPE in the claim 6 of this invention is either connected to a TAB, and then to the DSLAM (shown as Fig. 3 of this invention); or connected to the distance extension module by using a reserved telephone line which transits the DSLAM services (shown as in Fig. 4 of this invention). In other words, there is no anticipation of Applicant’s claim 6, and Applicant’s establishing a Customer-Provide Equipment for supplying an x Digital

Subscriber Line transmission service.

The “first unit” in the claim 11 of this invention is either connected to the “second unit” or connected to the “third unit” by using a reserved telephone line which transits the DSLAM services. Therefore, this invention as defined claims 1, 6 and 11 defines CPE in different networks from the system used in Kerkhof ‘639.

(4) The “DSLAM”

Applicant’s original specification demonstrates that Applicant along recognized a problem in the art, by stating that:

- (A) In the concept of extending an available distance of xDSL through modules for distance extension of xDSL using a reserved telephone line in accordance with one embodiment of the present invention, the xDSL service transmits, by using a reserved telephone line, between DSLAM, through one module for distance extension, and CPE or to another module for distance extension.
- (B) In the concept of extending an available distance of xDSL through modules for distance extension of xDSL using a reserved telephone line in accordance with two embodiments of the present invention, the xDSL service communicates, by using a reserved telephone line, between DSLAM, through one module for distance extension, and another module for distance extension. In this concept, a controller is employed in DSLAM to collect and use all link result data.

It may not be ignored that these observations are made only by Applicant, rather than by any of the authors of the vast body of xDSL art, Kerkhof ‘639 not only fails to recognize these deficiencies in the xDSL art, but is unable to address them.

Moreover, Kerkhof ‘639, however, does not disclose that DSLAM connects with

CPE module using reserved telephone lines, and that DSLAM connects with repeater container using reserved telephone lines”. In addition, Kerkhof ‘639 does not disclose that DSLAM connects simultaneously to terminal box and CPE module.

Kerkhof ‘639 states that the xDSL data transmits between the DSLAM having a LTU and the CPE having a NTU. See Kerkhof ‘639 [0002] and Fig. 2. Kerkhof ‘639 also states that the xDSL data transmits between the DSLAM and the repeater container. Kerkhof ‘639 nowhere states that the DSLAM is connected to the repeater container by using a reserved telephone lines, or as defined by Applicant’s claims, that the DSLAM may be coupled via a TAB to the CPE.

Therefore, Applicant’s claims which define Applicant’s DSLAM in a different environment from the environment used in Kerkhof ‘639, and the DSLAM defined by Applicant’s claims has a different structure from the structure of DSLAM employed by Kerkhof ‘639.

(5) “setting an initial link with the CPE for an xDSL transmission service, and transeiving data with the CPE through the set link”

In Applicant’s invention, the CO 610 is connected to the CPE 640 in serial during the initial link. In other word, while setting the initial link, the CO 610 is linked with the CPE module #1 621 of the first module for distance extension 620. Simultaneously, the CO module #1 623 of the first module for distance extension 620 is linked with the CPE module #2 631 of the second module for distance extension 630, and the CO module #2

633 of the second module for distance extension 630 is linked with the CPE 640, respectively. The present invention repeaters a process of re-transmitting data received through the CPE module #1 (621) and #2 (631) from the first CO 610, thereby overcoming maximum distance limits of the xDSL by using the first and second modules for distance extension 620, 630 having xDSL repeater effects.

Kerkhof '639, however, employs a number of repeaters and OMU to transmit data only within a maximum reach distance. The repeaters of Kerkhof '639 simply perform an amplifying function and don't perform an extending service distance of xDSL.

Kerkhof '639 nowhere teaches either (i) how an initial link is set up and (ii) how to transceive data through the set link, and in point-of-fact, Kerkhof '639 does not use the noun "link". As directed by **MPEP §2131**,

"a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Every element must be literally present, arranged as in the claim. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913, 1920 (CAFC 1989). The identical invention must be shown in as complete detail as is contained in the patent claim. *Id.*, "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 165 USPQ 494, 496 (CCPA 1970), and MPEP 2143.03. Absent teaching or suggestion of Applicant's "setting an initial link with the CPE for an xDSL transmission service, and transceiving data with the CPE through the set link", there

is no anticipation. Accordingly, there is no anticipation of Applicant's claims 1, 6 or 13.

(6) The "distance extension module"

Applicant's claims define a structure of a distance extension module which includes a CPE module, a CO module and a controller. The distance extension module is connected to DSLAM having a controller by a reserved telephone line to transmit the xDSL data. Consider following references of record:

- (A) Kerkhof '639 employs a number of repeaters and OMU to transmit data only within a maximum reach distance. The repeaters of Kerkhof '639 simply perform an amplifying function and don't perform an extending service distance of xDSL.
- (B) Kerkhof '639 nowhere mentions what kind of structure of the repeater has, or whether the repeater is considered to be a module, or whether the repeater contains any module. Kerkhof '639 also nowhere mentions that a reserved telephone line is employed in the communication between the repeater and DSLAM.
- (C) Consider the teachings of Erreyers (Patent No.: US 6,236,664 B1), Erreyers states the structure of the repeater which is shown in Fig. 4. Erreyers also nowhere teaches whether the repeater is a module or whether the repeater includes of any module or controller.
- (D) Further consider the definition of "repeater" (See Federal Standard 1037C):
"repeater: 1. An analog device that amplifies an input signal regardless of its nature, i.e., analog or digital. 2. A digital device that amplifies, reshapes, retimes, or performs a combination of any of these functions on a digital input signal for retransmission. (188) Note: The term "repeater" originated with telegraphy and referred to an electromechanical device used to regenerate telegraph signals. Use of the term has continued in telephony and data communications"

The previous references including (A), (B), (C) and (D) do not mention a distance

extension module which includes a CPE module, a CO module or a controller, as taught by Applicant in dependent claims.

(7) “distance extension module installed with at least more than one module between the DSLAM and CPE”

Applicant notes that the examiner’s proposed combination does not teach a structure which one of ordinary skill in the art would contemplate for transmitting the xSDL service between CPE (which has a controller) and DSLAM (which also has a controller) through distance extension module (which has a CO module, a CPE module and a controller) by a reserved telephone line. Consequently, (6) is not rendered as being anticipated by the reference cited by the Examiner.

(8) “receive x Digital Subscriber Line transmission data from the Digital Subscriber Line Access Multiplexer in connection with an optional reserved telephone line selected from telephone line bundles incoming from the Digital Subscriber Line Access Multiplexer”

Applicant notes that the examiner’s proposed combination does not teach a module able to transmit the xSDL service between CPE (which has a controller) and DSLAM (which also has a controller) through distance extension module (which has a CO module, a CPE module and a controller) by a reserved telephone line (which is selected from telephone line bundle which transmits xDSL service from DSLAM to home). The Examiner has incorrectly asserted that Kirkhof ‘639 a circuit able to “receive x Digital Subscriber Line transmission data from the Digital Subscriber Line Access Multiplexer in

connection with an optional reserved telephone line selected from telephone line bundles incoming from the Digital Subscriber Line Access Multiplexer” that contains that exact language of Applicant’s claim 1. Despite the thorough reading of Kirkhof ‘639, the exact language of Applicant’s claim 1 is absent. The completeness mandated by 37 C.F.R. §1.104(a)(b) and (c) is not provided by the Examiner’s explanation of Kirkhof ‘639. Clarification is respectfully requested. By way of example, the Examiner is respectfully requested to explain precisely which portion of Kirkhof ‘639 teaches Applicant’s “receive x Digital Subscriber Line transmission data from the Digital Subscriber Line Access Multiplexer in connection with an optional reserved telephone line selected from telephone line bundles incoming from the Digital Subscriber Line Access Multiplexer.”

Under 35 U.S.C. §102, it is error to assume that two structures are the same or equivalent simply because they perform the same function. The Federal Circuit has held it error to assume that two structures are the same or equivalent simply because they perform the same function. *Roton Barrier, Inc. v. Stanley Works*, 79 F.3d 1112, 1126-27 (Fed. Cir. 1996); *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 934 (Fed. Cir. 1987) (en banc) (“Pennwalt erroneously argues that, if an accused structure performs the function required by the claim, it is per se structurally equivalent”), *cert. denied*, 485 U.S. 961 (1988). Infringement (or anticipation) is found only if the claimed function is performed by either the same structure (or acts) that the specification describes or else by an equivalent of the structure (or acts). *Texas Instruments Inc. v. United States Int’l Trade Comm’n*, 805 F.2d 1558, 1562, 231 USPQ 833, 834-35 (Fed. Cir. 1986).

Accordingly, this rejection is improper under the all elements rule. Withdrawal of the rejection and allowance of claims 1 through 15 are respectfully requested.

The Applicant's foregoing remarks demonstrates that the Examiner's statements (1) through (7) written in Paper No. 20070705 are factually incorrect. This demonstrates that Kerkhof '639 fails to:

“show a system for extending a distance of xDigital Subscriber Line using a reserved telephone line, comprising: a Customer-Provided Equipment for supplying an x Digital Subscriber Line transmission service to a subscriber terminal; a Digital Subscriber Line Access Multiplexer setting an initial link with the Customer-Provided Equipment through the set link; and a distance extension module being install with at least more than one module between the Digital Subscriber Line Access Multiplexer and the Customer-Provided Equipment, in order to receive x Digital Subscriber Line Access Multiplexer in connection with an optional reserved telephone line selected from telephone line bundles incoming from the Digital Subscriber Line Access Multiplexer, and after separating the received transmission data, to transmit the separated transmission data to a module of a back end or the Customer-Provided Equipment, or to transmit transmission data received from the module of the back end or the Customer-Provided Equipment.” (Paper No. 20070705 page 2 and 3)

Consequently, there is no anticipation of claims 1, 6 and 13.

Claim 2, 7, 12

In addition of the objections to Claim 1, 6, and 11, the Examiner introduces “the repeaters in a series connection” in the objections to Claim 2, 7, 12. (See Paper No. 20070705 page 3-4)

Applicant notes that the examiner's proposed conclusion does not contemplate transmitting the xSDL service between CPE (which has a controller) and DSLAM (which also has a controller) through distance extension module (which has a CO module, a CPE module and a controller) by a reserved telephone line. Consequently, Claim 2, 7 and 12 are not rendered as being anticipated by the reference cited by the Examiner.

Claim 3, 8, 13

On page 4 of Paper No. 20070706, the Examiner states that

“As to claims 3, 8 and 13 Kerkhof shows a controller (OMU 24) for setting the initial link with the neighboring distance extension modules, receiving the link information set between the distance extension module and the Customer-Provided Equipment, and setting a link to the Customer-Provided Equipment.”

In Applicant's claims 3, 8 and 13:

In Applicant's invention, the CO 610 is connected to the CPE 640 in serial during the initial link. In other word, while setting the initial link, the CO 610 is linked with the CPE module #1 621 of the first module for distance extension 620. Simultaneously, the CO module #1 623 of the first module for distance extension 620 is linked with the CPE module #2 631 of the second module for distance extension 630, and the CO module #2 633 of the second module for distance extension 630 is linked with the CPE 640, respectively. The present invention repeaters a process of re-transmitting data received through the CPE module #1 (621) and #2 (631) from the first CO 610, thereby overcoming

maximum distance limits of the xDSL by using the first and second modules for distance extension 620, 630 having xDSL repeater effects.

- (A) While setting the initial link, the controller installed in DSLAM sets the initial link with the neighboring distance extension modules, receiving the link information set between the distance extension module and the CPE and set a link to CPE.
- (B) In the concept of extending an available distance of xDSL through distance extension module of xDSL using a reserved telephone line in accordance with one embodiment of the present invention, the controller installed in the distance extension module solves problems caused when the CO module is connected to the CPE module in serial.
- (C) In the concept of extending an available distance of xDSL through modules for distance extension of xDSL using a reserved telephone line in accordance with two embodiments of the present invention, the controller of the DSLAM collects all the data while the controller of the first distance extension module, the controller of the second distance extension module and controller in CPE keep the corresponding link result data until a low ordered link is shown.

In contradistinction, Kerkhof '639's application teaches that a number of repeaters and OMU are employed to transmit data only within a maximum reach distance. The repeaters of Kerkhof '639 simply perform an amplifying function and don't perform an extending service distance of xDSL.

The OMUs (operations and maintenance units) employed by Kerkhof '639 are connected to one or more repeaters of the repeater container. The OMUs in Kerkhof '639's system is to provide the upgrading software for the operation and maintenance of the repeaters. Kerkhof '639 does not teach the OMUs collects link data of the communication system. (See [0020])

Therefore, Kerkhof '639 fails to show a controller for setting the initial link with the neighboring distance extension modules, receiving the link information set between the distance extension module and the CPE, and setting a link to CPE.

II. Claim 4-5, 9-10, 14-15 (objected under 35 U.S.C. 103 (a))

On page 5 of Paper No. 200707005, the Examiner states:

“...As to claims 4,9, and 14 Kerkhof shows the distance extension module uses reserved telephone lines.... Witty shows a Main Distribution Frame 12, which connects DSL lines to internal lines...”

Kerkhof '639 employs a separate line for connecting OMU in DSLAM and OMU in the repeater container. The signal transmitting between the OMUs is voice baseband which is different from the signal transmitting through repeaters. This scenario makes resistant against influences from malfunctions of one or more repeaters. In any event, Kerkhof '639 would not introduce the reserved telephone lines transmitting xDSL signal.

The system in Witty '148 employs a MDF (Main Distribution Frame) to connect DSLs (digital subscriber lines) to internal lines within a telephone server's central office.

See the cited passage of Witty '148. In Column 1 line 16-19, Witty '148 states that:

“The system 10 includes a Main Distribution Frame 12 (SDF) for connecting digital subscriber lines 12 (DSLs) to internal lines 14 within a telephone server's central office 15.”

Furthermore, consider the definition of MDF in Federal Standard 1037C:

“Main Distribution Frame (MDF): A distribution frame on one part of which the external trunk cables entering a facility terminate, and on another part of which the internal user

subscriber lines and trunk cabling to any intermediate distribution frames terminate. Note 1: The MDF is used to cross-connect any outside line with any desired terminal of the multiple cabling or any other outside line. (188) Note 2: The MDF usually holds central office protective devices and functions as a test point between a line and the office. Note 3: The MDF in a private exchange performs functions similar to those performed by the MDF in a central office. Synonym (in telephony) main frame.”

Clearly, Witty ‘148 nowhere employs a reserved phone lines in the system. Therefore, the combination of Kerkhof ‘639 and Witty ‘148 fails to teach the methods stated in Claim 4-5, 9-10 and 14-15 of this invention.

Applicant notes that the examiner’s proposed conclusion does not contemplate transmitting the xSDL service between CPE (which has a controller) and DSLAM (which also has a controller) through distance extension module (which has a CO module, a CPE module and a controller) by a reserved telephone line. Consequently, Claim 4-5, 9-10, and 14-15 are not rendered obvious by the reference cited by the Examiner.

In view of the above, it is submitted that all of the claims now present in the application are patentable over the cited references, taken either alone or combination and accordingly should now be in a conditions suitable for allowance.

No other issues remaining, reconsideration and favorable action upon all of the claims now present in the application is respectfully requested.

No fee is incurred by this Amendment.

Respectfully submitted,



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